

REMARKS

In the Office Action, the Examiner rejected claims 22, 23, 25-37, 39 and 41-58 under 35 U.S.C. 102 and/or 103. These rejections are fully traversed below.

Claims 22, 48, 49 have been amended. Claims 26, 33, 50, and 64 have been cancelled. Claims 66-69 have been added. Dependent claims 33 and 64 were introduced into independent claim 22, and dependent claim 50 was substantially introduced into claim 49. Thus, claims 22-23, 25-32, 34-45, 47-49, 51-55, 60-63 and 65-69 are pending in the application. Reconsideration of the application is respectfully requested based on the following remarks.

Response to Examiner's Arguments

All the references fail to teach or suggest an impedance matching layer that equalizes the impedance at different points across the wafer.

With regards to the Examiners assertion of a method limitation, it is emphasized that the language of the claim is not directed at a method, but rather an apparatus. The impedance matching layer is a layer that adjusts or matches the impedances between at least two regions of the wafer. The term "adjusts" is not used to define a method step but rather a function of the impedance matching layer, and as described in *In re Swinehart and Sfiligoj*, 439 F.2d 210, 169 U.S.P.Q. 226 (C.C.P.A. 1971), the courts are convinced that there is no support, either in the actual holdings of prior cases or in the statute, for the proposition that "functional" language in and of itself, renders a claim improper. Accordingly, the limitation "an impedance matching layer configured to adjust the second impedance such that the second impedance is substantially equal to the first impedance" should be considered by the Examiner.

With regards to the Examiners assertion that the apparatus of *Ohmi*, *Masuda* or *Wicker* are capable of including the limitation, it is pointed out that none of these references teach such a limitation and therefore the rejections are improper. The Examiner is respectfully urged to show where in each of these references such a limitation is taught. As specified in MPEP 2131, a claim is anticipated only if each and every element as set forth in the claim are found in a single prior art reference. The fact that *Ohmi* shows an electrode 102, *Wicker* shows a pedestal 112 and

Masuda shows an insulator 133 is not enough. None of these elements matches or equalizes the impedance between two areas of the substrate. Accordingly, all the rejections should be withdrawn.

Claim Rejections - 35 U.S.C. 102 & 103

Claims 48-52 and 54 have been rejected under 35 U.S.C. 102(b) as being anticipated by *Ohmi et al* (WO 98/39500).

Claim 48

In contrast to *Ohmi*, claim 48 specifically requires, "...a first zone ... underneath a first region of the substrate... having a first impedance when energy is coupled therethrough; a second zone ... underneath a second region of the substrate, ... having a second impedance when energy is coupled therethrough, the second impedance being different than the first impedance..." No such feature is taught in *Ohmi*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Ohmi*, claim 48 specifically requires, "...at least a portion of the impedance matching layer being positioned within the second zone..." No such feature is taught in *Ohmi*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Ohmi*, claim 48 specifically requires, "...an impedance matching layer configured to adjust the second impedance such that the second impedance is substantially equal to the first impedance..." No such feature is taught in *Ohmi*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 49

In contrast to *Ohmi*, claim 49 (and its dependents) specifically requires, "...a first component disposed underneath an inner region of the substrate ...the first component producing a first impedance when energy is coupled therethrough; a second component disposed underneath an outer region of the substrate ... the second component producing a second impedance when energy is coupled therethrough, the first impedance being different than the

second impedance.” No such feature is taught in *Ohmi*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to *Ohmi*, claim 49 (and its dependents) specifically requires, “...at least a portion of the impedance matching layer being disposed underneath the substrate when the substrate is positioned inside the process chamber for processing.” No such feature is taught in *Ohmi*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to *Ohmi*, claim 49 (and its dependents) specifically requires, “...an impedance matching layer having characteristics configured to adjust the second impedance such that the second impedance is substantially equal to the first impedance...” No such feature is taught in *Ohmi*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claims 22, 23, 25-31, 48-55, 60-61 and 63-65 have been rejected under 35 U.S.C. 102(b) as being anticipated by *Masuda et al* (6,171,438).

Claims 32-37, 39, 41-45 and 47 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Masuda*.

It should be pointed out that the numbers in *Masuda* appear to be mislabeled. In Fig. 1 132 is placed on top of 133, but in Fig. 2 133 is placed on top of 132. In subsequent Figures, 132 is placed on top of 133. The arguments below are based on the numbers in Fig. 2 being reversed.

Claim 22

In contrast to *Masuda*, claim 22 (and its dependents) specifically requires, “...said impedance matching layer being entirely planar and parallel with a top surface of the electrode and a bottom surface of the edge ring.” As shown in Figs. 1, 2, 6, 7, and 8 of *Masuda*, the insulator 133 is L shaped and thus not entirely planar as required by the claim. See Figs. 3 and 4 of the present invention. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Masuda*, claim 22 (and its dependents) specifically requires, “...wherein a first impedance produced through said chuck is different than a second impedance

produced through said edge ring, and wherein said impedance matching layer is arranged to adjust said second impedance produced through said edge ring so that said second impedance is substantially equal to said first impedance produced through said chuck..." No such feature is taught in *Masuda*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 34

In contrast to *Masuda*, claim 34 (and its dependents) specifically requires, "...said impedance matching layer having characteristics configured to adjust said second impedance so as to improve processing uniformity across the surface of said substrate, said impedance matching layer being configured to match the impedance between said electrode and said plasma at the edge of said substrate with the impedance between said electrode and said plasma at the center of said substrate..." *Masuda* is completely silent to matching impedances at different points across the substrate. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 48

In contrast to *Masuda*, claim 48 (and its dependents) specifically requires, "...an impedance matching layer configured to adjust the second impedance such that the second impedance is substantially equal to the first impedance..." No such feature is taught in *Masuda*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 49

In contrast to *Masuda*, claim 49 (and its dependents) specifically requires, "...an impedance matching layer having characteristics configured to adjust the second impedance such that the second impedance is substantially equal to the first impedance..." No such feature is taught in *Masuda*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claims 22, 23, 25-31, 48-55 and 63-65 have been rejected under 35 U.S.C. 102(b) as being anticipated by *Wicker et al* (6,129,808).

Claims 32-37, 39, 41-43 and 47 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Wicker*.

Claim 22

In contrast to *Wicker*, claim 22 (and its dependents) specifically requires, "...said impedance matching layer being entirely planar and parallel with a top surface of the electrode and a bottom surface of the edge ring.." As shown in Fig. 1 of *Wicker*, the pedestal 112 is L shaped and thus not entirely planar as required by the claim. See Figs. 3 and 4 of the present invention. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Wicker*, claim 22 (and its dependents) specifically requires, "...an impedance matching layer disposed ... underneath said substrate when said substrate is resting on said pedestal..." No such feature is taught in *Wicker*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Wicker*, claim 22 (and its dependents) specifically requires, "...wherein a first impedance produced through said chuck is different than a second impedance produced through said edge ring, and wherein said impedance matching layer is arranged to adjust said second impedance produced through said edge ring so that said second impedance is substantially equal to said first impedance produced through said chuck..." No such feature is taught in *Wicker*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 34

In contrast to *Wicker*, claim 34 (and its dependents) specifically requires, "...said impedance matching layer having characteristics configured to adjust said second impedance so as to improve processing uniformity across the surface of said substrate, said impedance matching layer being configured to match the impedance between said electrode and said plasma at the edge of said substrate with the impedance between said electrode and said plasma at the center of said substrate..." *Wicker* is completely silent to matching impedances at different points across the substrate.. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 48

In contrast to *Wicker*, claim 48 specifically requires, "...at least a portion of the impedance matching layer being positioned within the second zone..." No such feature is taught in *Wicker*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Wicker*, claim 48 specifically requires, "...an impedance matching layer configured to adjust the second impedance such that the second impedance is substantially equal to the first impedance..." No such feature is taught in *Wicker*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 49

In contrast to *Wicker*, claim 49 (and its dependents) specifically requires, "...at least a portion of the impedance matching layer being disposed underneath the substrate when the substrate is positioned inside the process chamber for processing." No such feature is taught in *Wicker*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to *Wicker*, claim 49 (and its dependents) specifically requires, "...an impedance matching layer having characteristics configured to adjust the second impedance such that the second impedance is substantially equal to the first impedance..." No such feature is taught in *Wicker*. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claims 22, 23, 25-37, 39, 41-43, 47-55 and 64-56 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Tamura et al* (5,792,304) in view of *Ohmi*.

Claim 22

In contrast to both references, claim 22 (and its dependents) specifically requires, "...an impedance matching layer disposed ... underneath said substrate when said substrate is resting on said pedestal..." No such feature is taught in either reference. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Also in contrast to both references, claim 22 (and its dependents) specifically requires, "...wherein a first impedance produced through said chuck is different than a second impedance produced through said edge ring, and wherein said impedance matching layer is arranged to

adjust said second impedance produced through said edge ring so that said second impedance is substantially equal to said first impedance produced through said chuck..." No such feature is taught in either reference. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claim 34

In contrast to both references, claim 34 (and its dependents) specifically requires, "...said impedance matching layer having characteristics configured to adjust said second impedance so as to improve processing uniformity across the surface of said substrate, said impedance matching layer being configured to match the impedance between said electrode and said plasma at the edge of said substrate with the impedance between said electrode and said plasma at the center of said substrate..." Both references are completely silent to matching impedances at different points across the substrate.. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claims 48 and 49

Tamura does not overcome the deficiencies of *Ohmi* as discussed above (response to 102 rejection). Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claims 44-45, 60-61 and 63 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Tamura* in view of *Ohmi* and further in view of *Masuda*.

Masuda does not overcome the deficiencies of *Tamura* and *Ohmi* as discussed above. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Claims 44-45 and 60-61 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Wicker* in view of *Masuda*.

Masuda does not overcome the deficiencies of *Wicker* as discussed above. Accordingly, the rejection is unsupported by the art and should be withdrawn.

Although the dependent claims should be withdrawn for at least the reasons as above, it should be noted that they offer additional language that is unsupported by the art.

*New Claims*New Independent Claim 69

In contrast to all the references, claim 69 specifically requires, "a symmetrical and circumferential impedance matching layer ... configured to match the impedance between said electrode and a plasma at an edge of a substrate with the impedance between said electrode and said plasma at a center of said substrate so that energy is coupled more uniformly across the surface of the substrate." No such feature is taught in any of the references.

New Dependent claims 66-68

In contrast to all the references, claim 66 specifically requires, "...the top surface of the electrode is configured to be substantially uniform and substantially parallel to the substrate so as to provide an even distribution of energy."

In contrast to all the references, claim 67 specifically requires, "...the impedance matching layer is bonded ... via a silicon elastomer..."

In contrast to all the references, claim 68 specifically requires, "...the impedance matching layer is bonded to a backside of the edge ring... the second channel is configured to distribute the heat transfer medium to a second gap located between the electrode and the backside of the edge ring that includes the impedance matching layer."

SUMMARY

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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